

A NEW GENUS AND SPECIES OF CRANGONYCTOID AMPHIPOD (CRUSTACEA) FROM WESTERN AUSTRALIAN FRESH WATERS

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Summary

BRADBURY, J. H & WILLIAMS, W. D. (1995) A new genus of crangonyctoid amphipod (Crustacea) from Western Australian fresh waters. *Trans. R. Soc. S. Aust.* 119(2), 67-74, 31 May, 1995.

A new genus of crangonyctoid amphipod (Crustacea) from Western Australian fresh waters, *Totgammarus*, with a single species, *T. eximius*, is described. The species was collected from roadside pools in the south-west of Western Australia.

KEY WORDS: Amphipoda, *Totgammarus*, Western Australia, crangonyctoid, Paramelitidae.

Introduction

All known crangonyctoid species of Australian fresh waters to 1987 were comprehensively reviewed by Williams & Barnard (1988). In their review, known species were re-examined and redescribed, and some new species were described. They dealt with a total of 12 genera and 33 species. They considered the number of genera probably represented about half the number expected to occur in Australia and noted that the number of species within genera was probably small. Further work (Barnard & Williams, in press) supports this view; they described two new genera, each monotypic, as well as a further new species of both *Austrogammarus* and *Uroctena*. This second review by Barnard & Williams (in press) described, *inter alia*, most material available to them from Western Australia. They did not describe, however, a taxon from that State represented by only a single specimen, pending the collection of further material. Unfortunately, all attempts to obtain more specimens have proven unsuccessful; exhaustive examination of all the known collections from the area have yielded no further specimens and nor did collections made in 1994 on our behalf by A. J. Boulton.

Since the single available specimen represents in our view a new genus, and to facilitate further studies of freshwater amphipods in Western Australia in particular and Australia in general, we now consider it appropriate to describe this single specimen.

Methods of dissection, description and notation follow those of Williams & Barnard (1988). To expedite the use of figures in the present publication, the abbreviations are as follows: "Antennal sinus" refers only to the cephalic sinus receiving antenna 2. A - antenna; Abd - abdomen; acc - accessory; art - article; C - coxa, cox - coxal; d - dorsal; dact - dactylus; e - eye; E - epimeron; flag - flagellum; g - gill; G -

gnathopod; Hd - head; i - inner; l - left; lac - lacinia mobilis; lat - lateral; LL - lower lip; MD - mandible; med - medial; mol - molar; MP - maxilliped; MX - maxilla; o - outer; O - oostegite; p - palp; P - pereopod; PC - prebuccal complex; pl - plate; post - posterior; Pp - pleopod; r - right; ret - retinaculum; st - sternal; T - telson; U - uropod; UL - upper lip; v - ventral; 1,2,3...7 - first, second, third...seventh.

Genus *Totgammarus* gen. nov.

Etymology

Named for the combination of features of several genera.

Type species: *Totgammarus eximius*

Diagnosis

Pleon with sparse dorsal setation, rostrum weak. Lateral cephalic lobes strongly projecting, antennal sinus moderate, eye not discernible in preserved specimen. Flagellum of first antenna lacking major armaments, moderately long, about 0.5x body length, twice A2. Ratio of peduncular articles 2:2:1. Flagellum of second antenna and peduncle of sub-equal length, calceoli of type 9 present (Lincoln & Hurley 1981).

Ratio of mandibular palp articles about 2:9:6, article 2 moderately setose, article 3 falcate, setae = ABDE (Barnard & Barnard 1983). Labium lacking inner lobes. Maxillae 1-2 medially setose, inner plate wholly or marginally pubescent. Maxilla 1 outer plate ovate, medially and laterally setose, palps asymmetric; left with thin apical spines, right with thick apical spines. Maxilla 2 inner plate with row of apico-medial weakly sub-marginal setal spines, medial margin heavily setose. Maxillipedal palp articles 2-3 with few lateral setae, article 3 with fine facial pubescence dorsally and a ventro-facial row of moderately long, curved setae.

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Coxae 1-3 with a row of posterior spines, coxae 1-4 moderately elongate, coxa 1 tapering below, coxa 4 deeply emarginate post-dorsally, coxae 5-6 shorter than 4, coxa 7 shorter than 5-6. Gnathopods unequal, gnathopod 1 0.5x gnathopod 2. Carpus of gnathopod 1 long, of gnathopod 2 short. Scythe spine absent from article 4 of both gnathopods, each with a weak lobe. Propodus of both gnathopods rectangular, palms weakly to moderately convex, palmar corners prominent, turned out. First gnathopod lacking strong spines at palmar corner, second with 6 strong spines. Spines along palms of both gnathopods short, simple, without triggers, numerous.

Pereopods 3-4 with posterior spine sets on article 6 evenly spaced, P5-7 moderately elongate, article 2 broadly expanded, lobate. Dactyls with 1-3 spinules.

Coxae 2-7 with sac-like gills. Thoracic segments 2-7 with lateral sternal gills.

Basomedial setae on inner rami of pleopods 1-3 plumose, peduncles each with paired retinacula and paired (first and second pleopod) or single (third pleopod) plumose accessory retinacula.

Pleonites with few dorsal setae and/or spines. Epimera with few ventral spines, posterior margins weakly setulate. Ram of uropods 1-2 extending subequally, each with 2 rows of spines. Facial armaments of uropod 1 weak, largely absent on uropod 2 which bears a strong, elongate apico-medial spine. Uropod 3 extended, magniramous, peduncle short, outer ramus 2 articulate, article 2 short.

Telson longer than broad, 100% cleft, not laterally tumid, apically and disto-laterally weakly setose, bearing a single sub-apical spine on either lobe.

Additional description

Flagellum of A1-2 lacking major armaments. Apical margin of labrum extended. Accessory blades (rakers) on mandibles with inter-raker plumose setae interspersed among rakers and additional short plumose setae lying between rakers and molar. Molar triturative, with plumose apical seta. Mandibular palp article 3 shorter than 2; palp article 2 lacking baso-anterior setae with few median and apico-anterior setae. Both plates of second maxillae with rows of long distal setae. Maxillipedal palp moderately long. Article 3 weakly produced and finely pubescent at the apex which bears long terminal setae; baso-medially bearing a single sub-marginal seta; medially with a row of scythe setae extending to the base of the dactyl; setae of the ventral face constituting a comb row, as well as a single long mid-facial seta and a row of short setae basal to the comb row; the mid-distal dorsal face bearing fine pubescence.

Dactyl of first gnathopod not reaching palmar corner,

bearing a small, bent, inner tooth-spine. Dactyl of second gnathopod reaching to end of palm, bearing 2 small inner spines. Pereopod 7 shorter than 6. Article 2 of pereopods 5-7 equally setose posteriorly.

Sternal processes: fleshy sausage-shaped gills on thoracic segments 2-7, attached to mid-lateral margins of segments.

Postero-ventral apex of epimera 1-3 blunt, as in *Austrogammarus*. Pleopods similar, except for numbers of retinaculae, rami approximately equal. Outer ramus of uropods 1-2 slightly shorter than inner ramus. Apicolateral corner of peduncle of uropod 1 with 2 spines, ram of both first and second uropods with 5 apical spines. The third uropod extending beyond the first and second in the entire animal, peduncular spines apical and sub-apical, some medial setae of each ramus plumose. Ventrodorsal spine on urosomite 1 at base of uropod 1 short, as in *Austrogammarus*.

Relationship

This genus displays the characteristics of crangonyetoid amphipods in possessing (1) sternal gills (2) an accessory flagellum of the first antenna with two or more articles (3) calceoli of type 9 or linear (4) uropod 1 lacking a basofacial spine on the peduncle (5) a lower lip without inner lobes (6) a first gnathopod that is not melitoid or mittenform in shape (7) a first gnathopod that does not dominate the second, and (8) a mandibular palp of typical form (Williams & Barnard 1988).

The new genus fits the essential criteria of the family Paramelitidae in possessing sausage-like sternal gills, dorsal setae on the telson, and linear or type 9 calceoli. It differs from the Neoniphargidae in the absence of rugosities on the third article of the maxillipedal palp and gnathopods, the form of the gnathopods (not small and mittenform), the form of the carpi (not short and lobate), and non-dendritic or lump bearing sternal gills. It differs from the Perthiidae in that the first antenna is significantly longer than the second, the mandibular molar is normally developed and triturative, the outer plate of the maxilliped is not very small, the gnathopods are not large, nor are the carpi short and deeply lobate, the carpi and propodi are not eusirid, and the sternal gills are not dendritic.

Togammarus bears features in common with other paramelitid genera, such as blindness, which occurs in several, and in possession of an elongate spine on the second male uropod (as in some *Uroctena* spp.). The combination of characteristics however, is unique. The genus varies from *Austrogammarus*, the most primitive Australian paramelitid genus, in several ways. In *Togammarus*, dorsal setation of the pleonites is weak, the lateral cephalic lobes project strongly, the antennal sinus is moderate, eyes are absent, and the

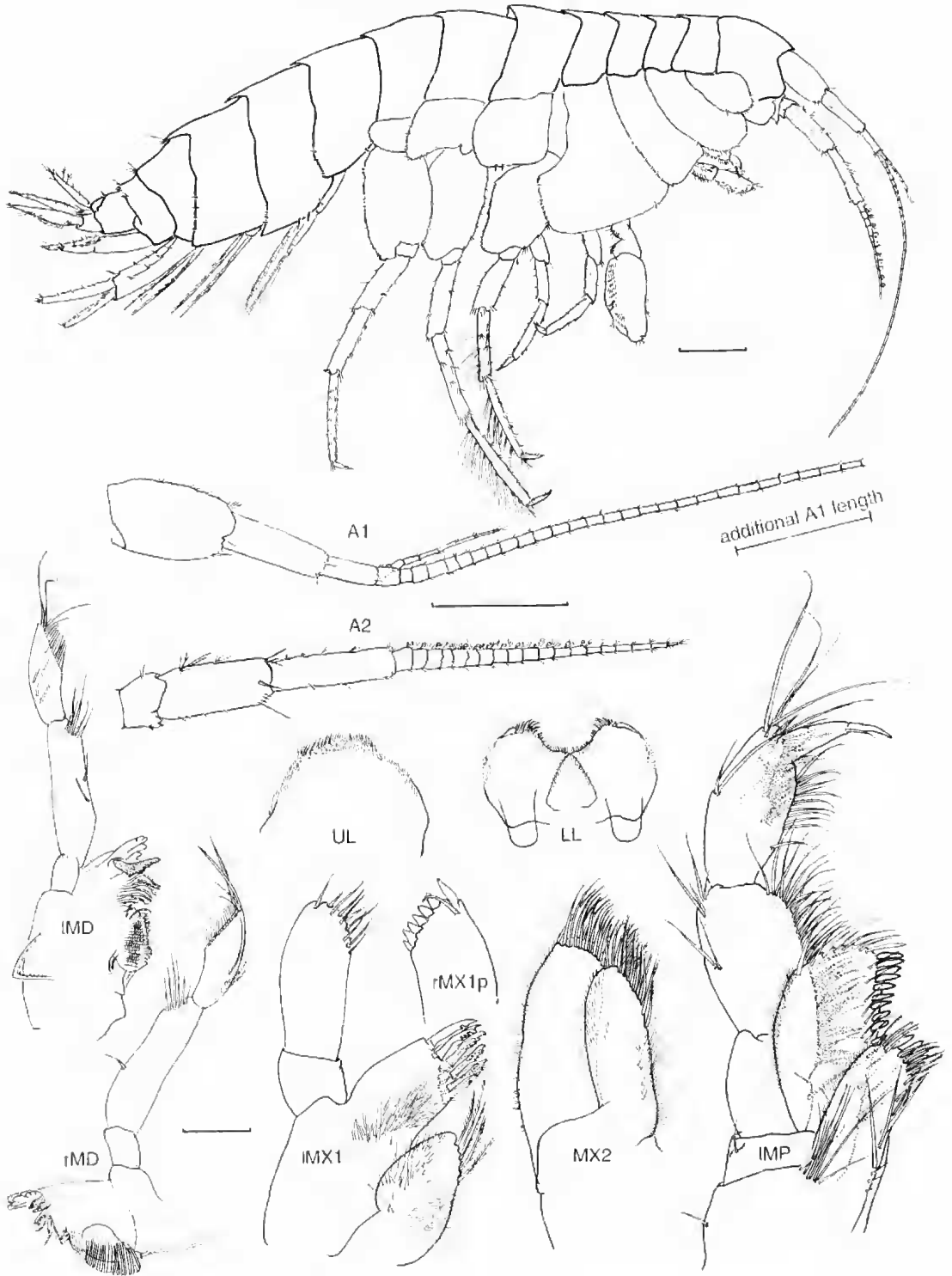


Fig. 1. *Toigammarus eximius*, sp. nov. holotype, male 10.6 mm. Whole animal, antennae and mouthparts. Scale bars: adult and antennae = 1 mm, mouthparts = 200 μm.

second article of the mandibular palp is relatively long with few apico-anterior and no baso-anterior setae. Additionally, there is an extension of the apical margin of the labrum. 5 rather than 3 apical spines occur on the inner plate of the maxilliped, coxae 1-4 are moderately long rather than elongate, the apex of coxa 1 tapers, pereopods 5-7 are more even in length, and a scythe spine is not present on article four of the gnathopods although a small lobe is present. The dactyls of legs 3-7 are multi-spinose. The peduncles of the pleopods are moderately setose, the apico-lateral and apico-medial spines of peduncles of the first uropod differ, as do the relative lengths of the uropod ramus which also bear baso-facial armaments. The third uropod is magniramous.

Totgammurus eximius sp. nov.
FIGS 1-3.

Etymology

From *eximius*, meaning exceptional or alone.

Type locality

Temporary roadside water in sands along the Scott River Road, south-western Western Australia.

Diagnosis

With the characteristics of the genus (only male known).

Material Examined Holotype

Western Australian Museum WAM14-95, male 10.6 mm in type series.
No other specimens available.

Description of holotype (male)

Body (Fig. 1), pleonites 3-6 with sparse transverse dorsal setation and dorso-lateral spines on 5-6.

First antenna (Fig. 1): primary flagellum sparsely setose, flagellum of 35 articles, 1.8 x peduncle. No calceoli. Accessory flagellum 7-8 articulate, reaching to article 8 of the primary flagellum. Second antenna (Fig. 1): length 0.25 x body length, peduncular articles 4-5 subequal, flagellum of 19 articles, setae sparse. Calceoli on articles 1-13. Labrum (Fig. 1): broadly rounded with apex slightly extended, laterally and apically pilose. Labium (Fig. 1): medially and laterally pilose with 10 curved apico-medial spines on either lobe.

Left mandible (Fig. 1): palp article 3 setation 1A-2B-3D-4E, article 2 with 2 medial setae and oblique row of 6 apico-medial setae. Incisor 6-toothed, lacinia mobilis 4-toothed, 9 setose accessory blades, 3 short plumose setae and 1 short blunt spine toward base of molar. Anterior of molar densely pilose. Molar with short plumose seta. Right mandible (Fig. 1):

incisor 4-toothed, lacinia mobilis bifid with 4 denticulate teeth on one side and 9 cusped teeth and a blunt terminal tooth on the other, accessory blades of 3 toothed spines and 4 setose inter-rakers, 3 short plumose setae and 1 narrow blunt spine toward the base of the molar. Molar with 1 setose median, short, blunt spine, and long plumose seta.

Left first maxilla (Fig. 1): palp article 2 with 10 thin apical spines, otherwise naked. Outer plate medially setose, 10 denticulate terminal spines. Inner plate ovate, laterally and medially with sparse straw-like pubescence, 5 apico-medial plumose setae. Right first maxilla (Fig. 1): palp article 2 with 6 thick apical spines, 1 disto-lateral moderately long spine and 1 lateral sub-apical curved spine. Outer plate with 10 denticulate terminal spines and 1 antero-medial plumose seta, median area with long pubescence. Inner plate as for left side.

Second maxillae (Fig. 1): symmetrical, outer plate laterally setose, sub-terminal row of 10 curved spines, terminal row of many curved setae. Inner plate laterally setose, sub-marginally pubescent; medial margin with fine setae proximally, row of setal spines distally.

Maxilliped (Fig. 1): palp article 3 with 9 medial scythe setae, 16 antero-facial comb row setae extending from M0.4 to the sub-apex, 4 long terminal setae, 2 mid lateral setae and 1 median seta. Dactyl bearing 1 distal and 1 medial accessory spines and, dorsally, 4 short post-facial setae basal to the comb row; outer plate laterally setose, apically bearing sub-terminal row of 8 strong curved spines, a disto-medial sub-facial row of 10 tooth spines and 13 setae, setae distally sub-facial to the teeth, proximally facial. Inner plate terminating in 5 strong tooth spines and 8 plumose setae; medially 6 long setal spines, the distal 4 plumose; basal to the inner plate a transverse row of 8 medium to long naked setae.

First gnathopod (Fig. 2): coxa tapered, 3 posterior spines, weakly setose marginally; carpus moderately long, sub-equal to propodus, not lobed; propodus rectangular, palmar corner prominent, extended posteriorly; palm acute, convex, dactyl reaching corner of palm, bearing small bent inner tooth, 5 plumose and 1 naked spines at palmar corner; numerous short spines along palm.

Second gnathopod (Fig. 2): larger than the first (Left 2x, Right 1.7x); coxa with row of 4 or 5 posterior spines, few small distal setae; carpus short, about 0.5x propodus; propodus rectangular, longer than wide, palmar corner with 2 strong, naked spines and 4 plumose spines, corner prominent and slightly extended posteriorly; dactyl not reaching corner, but reaching to the second naked spine, bearing 2 inner teeth at approximately M0.5; palm slightly convex with numerous short spines.

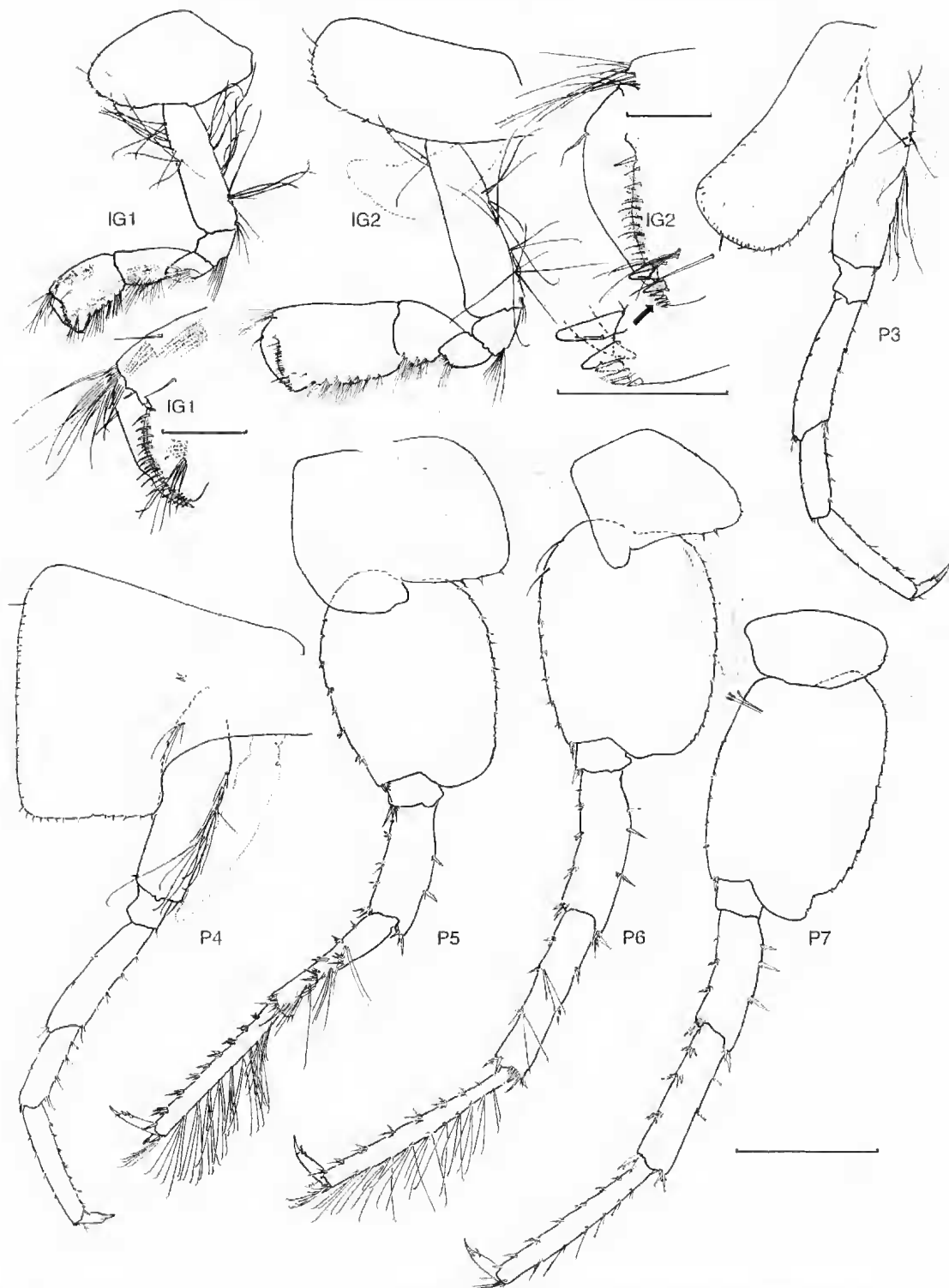


Fig. 2. *Totgammarus eximius*, sp. nov. holotype, male 10.6 mm. Gnathopods and pereopods. Scale bars: gnathopods and pereopods = 1 mm, dactylar enlargements = 200 μ m.

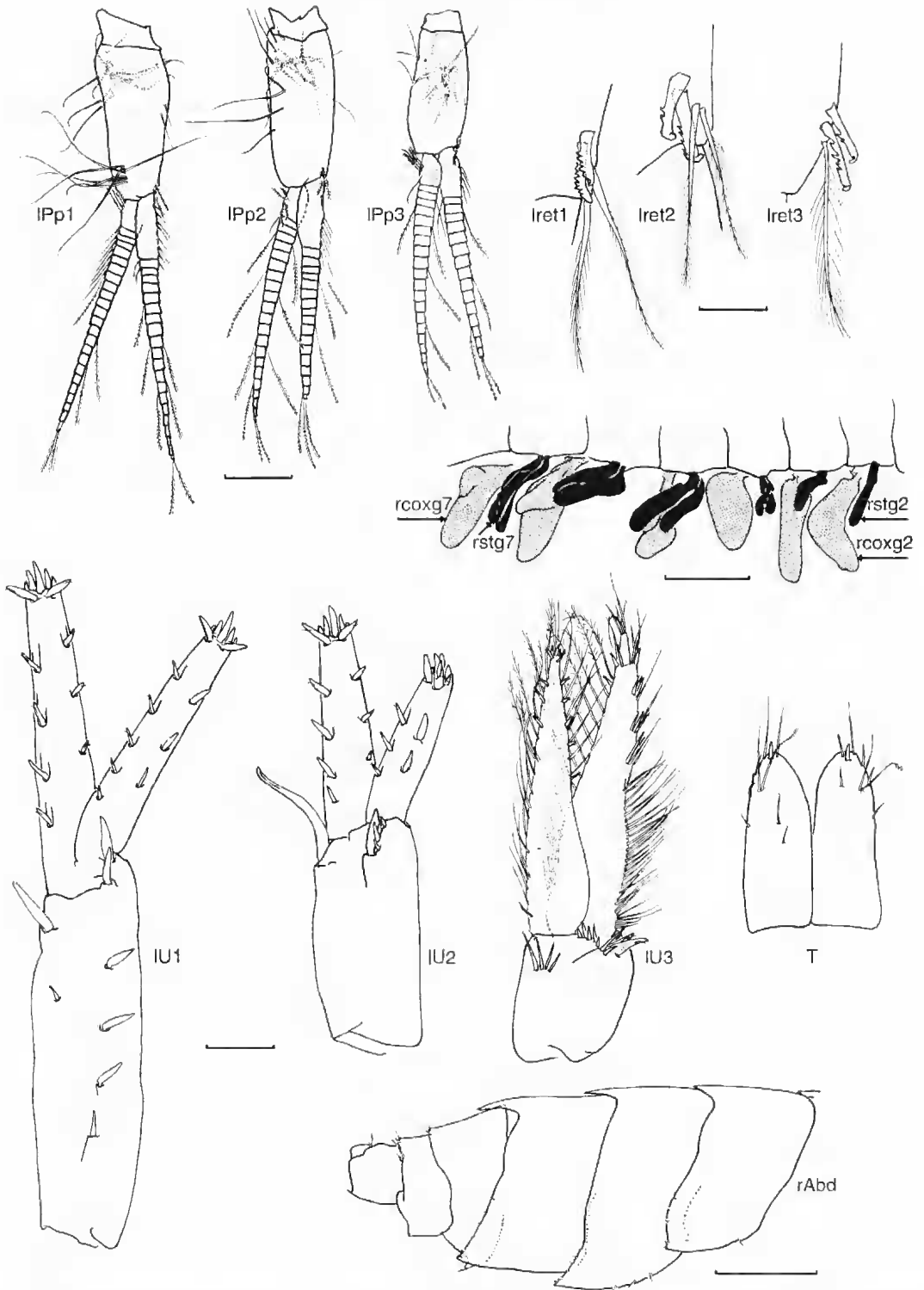


Fig. 3. *Totgammarius eximius*, sp. nov. holotype, male 10.6 mm. Pleopods, uropods, telson, gills and abdomen. Scale bars: abdomen and gills = 1 mm, pleopods, uropods and telson = 200 μ m, retinacules = 50 μ m.

Pereopods (Fig. 2): coxa 3 with 9 posterior spines, coxa 4 deeply emarginate, small setae and spines below, no posterior spines. Coxa 5 bearing 3 posterior ventral spines, coxa 6 with 3 posterior ventral spines and 4 small posterior setules. Coxa 7 with 4 posterior spines. Pereopods 3 - 4 length 1.2 x G2, subequal, article 2 of both bearing long posterior setae. Article 5 of P3 apico-posterior spine formula (proximal to distal): 1 - 2 - 2 - 2, article 6; 1 - 3 - 3 - 3 - 2 - 2 - 2, article 5 of P4; 2 - 3 - 3 - 4, article 6; 3 - 3 - 3 - 3 - 3 - 3 - 3. Pereopods 5 - 7 of approximately equal length. Pereopod 5 articles 5 - 6 bearing long apico-posterior setae, apico-anterior spine formulae 2 - 3 - 2 and 3 - 4 - 4 - 4 - 3 - 3 - 4 - 4. Pereopod 6 article 5 bearing few long setae, article 6 many apico-posterior setae, spine formulae 4 - 3 - 4 - 0 and 2 - 4 - 4 - 5 - 0 - 3 respectively. Pereopod 7 apico-anterior spine formulae: article 5: 4 - 6 - 6 and article 6: 3 - 3 - 4 - 4 - 4 - 3.

Gills (Fig. 3): coxal gill 5 slightly reduced, gills 5 - 7 bi-lobed. Sternal gills 2-7 lateral.

Epimera (Fig. 3): with few ventro-facial spines, posterior margins with few small setules. Epimeron 1 slightly rounded posteriorly with single antero-ventral spine. Epimeron 2 with 3 small mid-ventral setae only. Epimeron 3 naked ventrally.

Pleon (Fig. 3): pleonites 3 - 6 with dorsal spines and/or setae. Pleonite 5 with 5 spines in transverse groups of 2 and 3. Urosomite 6 with 1 dorsal spine on either side.

Pleopods: pleopods 1 and 2 bearing paired, hooked retinaculae and paired accessory retinaculae, pleopod 3 lacking second accessory retinacula. Uropods (Fig. 3): first uropod; peduncle length 1.2 x rami, outer margin with 1 apico-facial spine, 2 medial spines, and strong row of 5 dorsal spines, without setae. Rami subequal, terminating in a cluster of 5 spines. Second uropod; peduncle length equal to rami, lacking spine rows, but with a cluster of 1 large and 4 short apico-

facial spines. Inner medial angle with elongate spine 0.5 x length of peduncle, terminally spoon shaped. Inner ramus 1.3 x length of outer, lacking setae. Both rami terminating in a cluster of 5 spines. Third uropod: peduncle length 0.35 x length of outer ramus, about the same length as urosomite 3, bearing median transverse row of 5 spines, distal transverse row of 7 spines at the base of the outer ramus and a group of 4 apico-lateral spines. Outer ramus proximal article strongly setose baso-laterally with 4 disto-lateral clusters of spines and setae, paired medial and single lateral trigger spines apically, medially a single sub-apical trigger spine and evenly spaced plumose setae. Small distal article, 0.13 x proximal, terminating in 3 short and 2 long setae. Inner ramus of a single article, equal to the length of the proximal article of the outer ramus, marginally setose, the medial setae plumose, 6 lateral and 5 medial trigger spines distally, 2 terminal spines and 4 setae.

Telson (Fig. 3): 1.25 x urosomite 3, cleft 100%. Disto-lateral margins and apex with sparse dorsal setation, paired penicillate setules sub-marginal at M.80. Single sub-apical spine on either lobe.

Distribution

Western Australia (south west), Scott River Road, sands in a roadside ditch coll. K. Davies, B. Knott, 03 Oct. 1981.

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